Design Structural Stability Metrics And Post-Release Defect Density: An Empirical Study

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Summary

This paper empirically explores the correlations between a suite of structural stability metrics for object-oriented designs and post-release defect density. The investigated stability metrics measure the extent to which the structure of a design is preserved throughout the evolution of the software from one release to the next. As a case study, thirteen successive releases of Apache Ant were analyzed. The results indicate that some of the stability metrics are significantly correlated with post-release defect density. It was possible to construct statistically significant regression models to estimate post-release defect density from subsets of these metrics. The results reveal the practical significance and usefulness of some of the investigated stability metrics as early indicators of one of the important software quality outcomes, which is post-release defect density.